Space Weather Forecast

Issued on Sunday, 14 January 2024 at 13:18 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Chance of Moderate-class X-ray flares.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity is at Low levels. The largest flare of the period was a high level common class flare peaking at 14/1206 UTC, attributed to a region beyond the northwestern limb. There are fourteen sunspots on the visible disc. Two large spots reside in the southeast, these are both characterised by large leaders followed by small spots and pores of opposite polarities, the latter of which has developed some magnetic complexity in it's trailing region. The most complex region is in the southwest. There is evidence of magnetic looping between regions, which may result in greater instability. All other spots remain small or simple at present.

No coronal mass ejections observable on coronagraph imagery over the past 24 hours are expected to have an Earth-directed component.

Solar Wind / Geomagnetic Activity: Solar wind parameters, as observed by DSCOVR at L1, have been indicative of background conditions perhaps with a weak transient arrival around 14/1715 UTC, though due to the lack of ACE observations to corroborate, confidence in specific parameters is low. Solar wind speeds are thought to be Slow/Ambient to Slightly Elevated, around 330-470 km/s. Density is thought to have been Average or below. The interplanetary magnetic field (IMF), Bt, has been weak throughout, at or below 7nT. The north-south component, Bz, was weak and mostly negative, fluctuating between +2/-7nT, though a more notable period of -Bz was observed beginning 14/0715 UTC. Phi angle has been positive (away from the Sun) throughout. Geomagnetic activity was Quiet (Kp 0-2).

Energetic Particles / Solar Radiation: Solar radiation was at background levels, with no solar radiation storms observed.

Four-Day Space Weather Forecast Summary

Solar Activity: There is a chance of isolated Moderate-class activity and a slight chance of Strong flares.

Solar Wind / Geomagnetic Activity: No Earth-directed coronal mass ejections feature in the forecast. Solar wind are expected to gradually decline before the arrival of a weak coronal hole high speed stream, late day 3 (16 Jan) or day 4 (17 Jan), bringing slightly elevated solar wind speeds once again.

Overall, geomagnetic activity is likely to be Quiet (Kp 0-2) throughout, but with a chance of Unsettled to Active (Kp 3-4) intervals on day 4 should we see any coronal hole fast wind influence.

Energetic Particles / Solar Radiation: Solar radiation is expected to persist at background levels. Although, there remains an ongoing slight chance of seeing an increase to the S1/Minor Radiation Storm threshold, should any notable flares occur.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	1	1	5	5
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	45	40	40	50
Very Active	R3 to R5 X	No	5	5	5	5

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	5	5	5	5
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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